

WHAT IS CLAIMED IS:

1. A method of automatically allocating a unique address to a network device, comprising the steps of:

5 introducing a set of identifiers associated with the network device, each identifier designating an assignment of the network device to a hierarchical layer of devices in the network and being unique to the layer; and

 applying a first transformation, which has the inverse transformation, to the set of identifiers, the value of the transformation being the address of the network device.

2. A method as described in claim 1, wherein the step of applying the transformation comprises applying a function, which has the inverse function.

3. A method as described in claim 2, wherein the step of applying the function comprises applying a linear function.

20 4. A method as described in claim 2, wherein the step of applying the function comprises applying a non-linear function.

5. A method as described in claim 1, the method providing allocation of the Internet protocol (IP) address to the network device.

5 6. A method as described in claim 1, further comprising the step of arranging the addresses of the devices in the network in a predetermined order, comprising:

communicating the device addresses assigned in the method of claim 1 between the devices that are directly connected to each other by one of the physical and logical link;

for each device, applying an ordering condition to the existing address of the device and the address received from the connected device; and

if the condition is satisfied, apply a second transformation having the inverse transformation, to one of the existing and received device addresses to change one of the existing and received addresses so that the network device addresses are unique and arranged in the order defined by the second transformation.

20 7. A method as described in claim 6, wherein the step of applying the second transformation comprises the step of applying a function.

8. A method as described in claim 1, the method providing allocation of the addresses to one or more of the following network devices: network area, node, shelf, card, port and slot.

5 9. A method as described in claim 6, the method providing allocation of the addresses to one or more of the following network devices: network area, node, shelf, card, port and slot.

10. A method as described in claim 9, wherein the method provides allocation of port addresses in the network and wherein the step of applying the first transformation comprises applying the transformation whose values are even numbers only.

11. A method as described in claim 10, wherein the step of applying the ordering condition comprises applying a logical comparison of the existing the received port addresses.

12. A method as described in claim 11, wherein the ordering condition is satisfied if the existing port address is smaller than the received port address, and the step of applying the second transformation comprises applying the transformation that re-assigns a new port address instead of the existing port address by assigning an odd number which is smaller than the

received port address and greater than the existing port address.

13. A method as described in claim 12, wherein the step of
5 the re-assigning the new port address comprises assigning the odd number as the port address, the odd number being smaller than the received address by unity.

14. A method as described in claim 6, wherein the step of
10 communicating the device addresses comprises communicating the device addresses according to a network protocol, comprising forming a data structure including the device address and encapsulating the data structure directly in an Open Systems Interconnections (OSI) layer 2 frame.

15. A method as described in claim 14, wherein the step of
encapsulating the data structure comprises encapsulating the data structure in one of the following frames: ATM frame, frame-relay frame, Ethernet frame.

20 16. A method as described in claim 14, wherein the step of communicating the device addresses comprises communicating the addresses between the devices in the network that support Sub-Network Access Protocol (SNAP).

17. A method of transmitting information between directly connected network devices supporting a Sub-Network Access Protocol (SNAP), comprising:

5 forming a data structure including the information to be transmitted; and

 encapsulating the data structure directly in an Open Systems Interconnections (OSI) layer 2 frame.

10 18. A system for of automatic allocation of a unique address to a network device, comprising:

 means for introducing a set of identifiers associated with the network device, each identifier designating an assignment of the network device to a hierarchical layer of devices in the network and being unique to the layer; and

 means for applying a first transformation, which has the inverse transformation, to the set of identifiers, the value of the transformation being the address of the network device.

20 19. A system as described in claim 18, wherein the means for applying the transformation comprises means for applying a function, which has the inverse function.

20. A system as described in claim 19, wherein the means for applying the function comprises means for applying one of the linear function and non-linear function.

5 21. A system as described in claim 20, further comprising a means for arranging the network addresses in a predetermined order, comprising:

means for communicating the allocated device addresses between the devices that are directly connected to each other by one of the physical and logical link;

at each device, means for applying an ordering condition to the existing address of the device and the address received from the connected device; and

means for applying a second transformation having the inverse transformation, if the condition is satisfied, to one of the existing and received device addresses to change one of the existing and received addresses so that the device addresses in the network are unique and arranged in the order defined by the second transformation.

20 22. A system as described in claim 21, wherein the means for applying the second transformation comprises the means for applying a function.

23. A system as described in claim 21, wherein the means for communicating the device addresses comprises means for communicating the device addresses according to a network protocol, comprising means for forming a data structure including the device address, and means for encapsulating the data structure directly in an Open Systems Interconnections (OSI) layer 2 frame.

24. A system as described in claim 23, wherein the means for encapsulating the data structure comprises means for encapsulating the data structure in one of the following frames: ATM frame, frame-relay frame, Ethernet frame.